APRIL, 1906 NUMBER 44

The University of North Carolina

RECORD

Department of Applied Sciences

CHAPEL HILL, N. C.
1906

THE UNIVERSITY PRESS

CHAPEL HILL

CALENDAR.

1906.

September 10–15	*Monday to Saturday.* Examinations for Removal of Conditions.
September 10-12.	*Monday, Tuesday, Wednesday.* Examinations for Admission into the College. Registration.
September 13.	*Thursday.* Lectures begin.
October 12.	*Friday.* University Day.
November 29.	*Thursday.* Thanksgiving Day.
December 21.	*Friday.* Christmas Recess begins.

1907.

January 2, 3.	*Wednesday, Thursday.* Registration.
January 4.	*Friday.* Lectures begin.
February 22.	*Friday.* Washington's Birthday.
May 1.	*Wednesday.* Selection of Commencement Orators.
May 15.	*Wednesday.* Last Day for the Delivery of Graduating Theses at the Registrar's Office.
June 2.	*Sunday.* Baccalaureate Sermon. Sermon before the Y. M. C. A
June 3.	*Monday.* Inter-Society Banquet and Reunions.
June 4.	*Tuesday.* Senior Class Day. Address to the Alumni. Meeting of the Board of Trustees. Inter-Society Debate.
June 5.	*Wednesday.* Commencement Day. Summer Vacation begins.
June 13.	*Thursday.* Summer Law School Begins.
September 9-14.	*Monday to Saturday.* Examinations for Removal of Conditions.

DEPARTMENT OF APPLIED SCIENCES.

FACULTY.

FRANCIS PRESTON VENABLE, PH.D., D.SC., LL.D., PRESIDENT.
JOSHUA WALKER GORE, C.E., DEAN, *Professor of Physics.*
WILLIAM CAIN, C.E., *Professor of Mathematics.*
COLLIER COBB, A.M., *Professor of Geology and Mineralogy.*
CHARLES HOLMES HERTY, PH.D., *Smith Professor of General and Industrial Chemistry.*
JOSEPH HYDE PRATT, PH.D. *Professor of Economic Geology.*
ALVIN SAWYER WHEELER, PH.D., *Associate Professor of Organic Chemistry.*
ARCHIBALD HENDERSON, PH.D., *Associate Professor of Mathematics.*
JAMES EDWARD LATTA, A.M., *Associate Professor of Physics.*
JAMES EDWARD MILLS, PH.D., *Associate Professor of Physical Chemistry.*
MARVIN HENDRIX STACY, A.M., *Associate Professor of Civil Engineering.*
ROYALL OSCAR EUGENE DAVIS, PH.D., *Instructor in Chemistry.*
NATHANIEL CORTLANDT CURTIS, PH.B., B.S., *Instructor in Drawing.*
THOMAS FELIX HICKERSON, PH.B., *Instructor in Mathematics.*
JULIAN COLGATE HINES, JR., B.S., *Assistant in Physics.*
EDGAR EUGENE RANDOLPH, A.B., *Assistant in Chemistry.*
RISDEN TYLER ALLEN, *Assistant in Chemistry.*
HAMPDEN HILL, *Assistant in Chemistry.*
GEORGE ANDERSON JOHNSTON, B.S., *Assistant in Chemistry.*
EDWIN BEDFORD JEFFRESS, *Assistant in Geology.*
BENNETT HESTER PERRY, *Assistant in Geology.*
ROBERT HENRY McLAIN, *Assistant in Mathematics.*

ADMISSION.

Admission into the Freshman Class.

The requirements for admission into the Freshman class in the Department of Applied Sciences are the same as in the Academic Department. See general Catalogue, pp. 22–26.

Applicants are received by examination or by certificate from accredited schools.

Entrance examinations are held in September. Arrangements have been made with certain schools in the State whereby examinations for admission may be held in May, also, at the schools. The University will accept the uniform entrance examination papers of the Association of Colleges and Preparatory Schools of the Southern States, provided such papers are properly vouched for and sent sealed to the University for grading. Candidates for admission by examination must report at 9 A. M. *Monday, September 10, 1906*, to the Registrar, who will appoint time and place for examination.

Students who present certificates of work accomplished at preparatory schools or colleges may be admitted without examination, provided the certificates are approved. The right to examine, however, is reserved, when such a course is deemed necessary. Certificates must be made out on the printed forms furnished on application to the Registrar. They must be submitted for approval to the Committee on Entrance Certificates in No. 10 Alumni Building during the period of registration (*September 10, 11, 12, 1906,*) and then deposited with the Registrar before the work can be officially credited.

Subjects Accepted for Entrance.

All candidates for admission to the Freshman Class must offer preparation in Mathematics, in English, in History, and in the subjects designated in one of the following groups:

Group 1.	Group 2.	Group 3.
Latin	Latin or Greek	French
Greek	French or German	German
	Physics	Physics

When applicants have had no preparation in Greek or in French or in German or in Physics, the requirements may be satisfied by pursuing the corresponding courses in College. But these studies will not then be counted as any part of the requirement for the bachelor's degree.

A student may be admitted with limited conditions in those subjects which are not taught in the University.

The requirements in each of the subjects offered for entrance are as follows:

1. GREEK. Three books of Xenophon's Anabasis; acquaintance with the more usual forms and constructions; simple narrative in English, based upon Xenophon's Anabasis, to be translated into Greek.

2. LATIN. Two books of Caesar's Gallic War; four orations of Cicero, six books of Vergil's Aeneid; Latin Grammar, including prosody; simple narrative in English, based upon the prose read, to be translated into Latin.

3. *ENGLISH. I. Grammar. Elements of Rhetoric.
II. Literature.

(*a*) For reading:—Shakspere's The Merchant of Venice and Macbeth; The Sir Roger de Coverley Papers in The Spectator; Irving's Life of Goldsmith; Coleridge's Ancient Mariner; Scott's Ivanhoe and Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Lowell's The Vision of Sir Launfal; George Eliot's Silas Marner.

(*c*) For study and practice:—Shakspere's Julius Caesar; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

The candidate is expected to have sufficient knowledge of the books grouped under (*a*) to enable him to answer general questions on their substance. The form of the examination will be the composition of paragraphs on a number of topics connected with the works. The ability of the candidate to express his ideas in clear accurate English is a main consideration.

* These requirements are uniform with those of the leading colleges in the United States.

No applicant should present himself who is notably deficient in spelling, grammar or paragraphing. Under group (*b*) are enumerated the works that are to be carefully studied. The questions will be upon subject matter and structure.

4. HISTORY. Either of the following courses:

(*a*) The histories of the United States, Greece and Rome, as outlined in the best text books for high schools.

(*b*) The histories of the United States and England as outlined in the best text books for high schools.

5. MATHEMATICS. A good working knowledge of Arithmetic, including fundamental operations (particularly on common and decimal fractions), compound numbers, percentage, interest and extraction of square root; the whole of a high school Algebra and a college or academic Algebra to quadratics; the first three books of Plane Geometry. In 1907 the requirements in Geometry will be increased to the whole of Plane Geometry.

6. GERMAN. A thorough knowledge of the inflections, including the most common strong verbs; acquaintance with the ordinary laws of German syntax; such facility in translation as is gained by a careful study of at least 150 duodecimo pages of ordinary modern German prose; ability to translate into German simple sentences based on the passage assigned for examination; accurate pronunciation.

7. FRENCH. A knowledge of the forms and uses of the various parts of speech, including irregular verbs; translation of about 200 duodecimo pages of French prose into good idiomatic English; translation of simple English sentences into French; accurate pronunciation.

It is recommended that the preparation for entrance examinations in German and French be extended over two full school years, with four recitation periods per week, so as to allow time for short lessons with dictation exercises, oral practice, and frequent reviews.

8. PHYSICS. The whole of an elementary course such as is contained in Carhart and Chute's High School Physics or its equivalent, embracing the work of at least one session of nine months.

COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE.

In order to be recommended for the degree of Bachelor of Science, the student must have passed satisfactory examinations in all the studies required in one of the four courses outlined in this department. The student elects one of the three groups in the Freshman year of the four courses, and also in the Sophomore year of course 1, as the requirement for these years. Each course combines instruction in certain sciences and their application to the arts with certain other general studies deemed necessary for a liberal education. These courses are designed to furnish the fundamental instruction and to prepare students to pursue the technical professions to which they lead. The courses are four in number:

I. Chemistry.
II. Electricity.
III. Civil Engineering.
IV. Mining and Metallurgy.

In addition to the degree of Bachelor of Science, a special certificate will be given on the completion of any one course.

I. CHEMISTRY.

Freshman Year.

Group 1.	Group 2.	Group 3.
English 1 (3)*	English 1 (3)	English 1 (3)
Mathematics 1 (4)	Mathematics 1 (4)	Mathematics 1 (4)
Greek 1 (4)	Select one: Greek 1 (4) / Latin 1 (4)	Select one: German 2 (3) / French 2 (3)
Latin 1 (4)	Select one: German 2 (3) / French 2 (3)	Select two: History 1 (3) / Spanish 1 (3) / Geology 1 (3)
	Select one: German 1 (3) / French 1 (3) / History 1 (3)	

* Numerals in parentheses indicate the number of hours per week in each study.

Sophomore Year.

Group 1.	Group 2.	Group 3.
English 2 (3)	English 2 (3)	English 2 (3)
Mathematics 2 (3)	Mathematics 2 (3)	Mathematics 2 (3)
Chemistry 1 (3)	Chemistry 1 (3)	Chemistry 1 (3)
Chemistry 3 (2)	Chemistry 3 (2)	Chemistry 3 (2)
Physics 1 (3)	Physics 1 (3)	Physics 1 (3)
German 1 (3)	Select one: German 1 (3), German 2 (3), French 1 (3), French 2 (3)	Select one: German 2 (3), French 2 (3)

Junior Year.

Elective (2)
Chemistry 2 (3)
Chemistry 4 (3)
Chemistry 5 (5)
Drawing 1 (2)

Senior Year.

Elective (3)
Chemistry 6 (2)
Chemistry 7 or 7A (2)
Chemistry 8 (5)
Geology 2 (2)
Physics 6 ($1\frac{1}{2}$)

II. ELECTRICITY.

Freshman Year.

(Same as Freshman Year of Course I).

Sophomore Year.	Junior Year.	Senior Year.
English 2 (3)	Elective (2)	English 4 (3)
Mathematics 2 (3)	Mathematics 3A (3)	Physics 7 (4)
Chemistry 1 (3)	Physics 4A (2)	Physics 8 and 9 (2)
Chemistry 3 (2)	Physics 6 (3)	Chemistry 2 (3)
Physics 1 (3)	Drawing 1 (2)	Drawing 2 (2)
Physics 4 (2)	Select one: Mathematics 4 (3), Chemistry 4 (3)	

III. CIVIL ENGINEERING.

Freshman Year.

(Same as Freshman Year of Course I).

Sophomore Year.	Junior Year.	Senior Year.
English 2 (3)	Elective (3)	English 4 (3)
Mathematics 2 (3)	*Mathematics 3B (2)	*Mathematics 7A (2)
*Mathematics 3 (2)	Mathematics 4 (2)	*Mathematics 8 (3)
Chemistry 1 (3)	*Mathematics 7 (3)	*Mathematics 10 (3)
Physics 1 (3)	Geology 3 (3)	Elective (3)
Drawing 1 (2)	Drawing 2 (2)	

IV. MINING AND METALLURGY.

Freshman Year.

(Same as Freshman Year of Course I).

Sophomore Year.	Junior Year.	Senior Year.
English 2 (3)	Elective (2)	Drawing 2 (2)
Mathematics 2 (3)	Mathematics 4 (3)	English 4 (3)
Physics 1 (3)	Physics 6 (3)	Chemistry 4 (3)
Chemistry 1 (3)	Geology 2 (2)	Geology 4 (3)
Chemistry 3 (2)	Chemistry 2 (3)	Geology 6 (3)
Geology 3 (3)	Drawing 1 (2)	Mathematics 3 (a) (1½)
	Ore Deposits (24 lectures)	Mining (10 lectures).

* See "Civil Engineering" pages 17 and 18.

SPECIAL COURSE IN SOIL INVESTIGATION.

Students who have satisfied the entrance requirements and have completed the following prerequisites and also the prescribed two years' course will receive a certificate on SOIL INVESTIGATION.

Prerequisites: English 1 and 2; Mathematics 1; Physics A; and two of the following: German 1, French 1, Spanish 1.

FIRST YEAR. Chemistry 1 (3); Chemistry 3 (2); Physics 1 (3); Geology 1 (3); Soils 1 (3).

SECOND YEAR: Zoology 1 (3); Botany 1 (3); Chemistry 4 (3); Geology 8 (3); Soils 2 (2); Mapping (2).

COURSES OF INSTRUCTION.

CHEMISTRY.

CHARLES HOLMES HERTY, PH.D., *Smith Professor of General and Industrial Chemistry.*

ALVIN SAWYER WHEELER, PH.D., *Associate Professor of Organic Chemistry.*

JAMES EDWARD MILLS, PH.D., *Associate Professor of Physical Chemistry.*

ROYAL OSCAR EUGENE DAVIS, PH.D., *Instructor in Chemistry.*

EDGAR EUGENE RANDOLPH, A.B., *Assistant in Chemistry.*

RISDEN TYLER ALLEN, *Assistant in Chemistry.*

GEORGE ANDERSON JOHNSTON, B.S., *Assistant in Chemistry.*

HAMPDEN HILL, *Assistant in Chemistry.*

Professor HERTY and Dr. DAVIS.

1. General Descriptive Chemistry: a study of the elements and their compounds, including an introduction to Organic Chemistry; lectures with laboratory work. *Both terms, three hours.*

Professor HERTY.

2. Technical Chemistry. (*a*) Industrial and Agricultural Chemistry; glass-making, acids, alkalies, phosphates, fertilizers, foods, clothing, hygiene, etc. (*b*) Metallurgy: mining, treatment of ores, smelting, chlorination, fuel, building materials, etc. *Both terms, three hours.*

Associate Professor WHEELER, Messrs. RANDOLPH and ALLEN.

3. Qualitative Analysis; laboratory work with lectures. May be taken with Chemistry 1. *Both terms, two hours.*

Professor HERTY and Associate Professor MILLS.

4. Quantitative Analysis and Assaying; laboratory work, lectures, and

stoichiometric exercises; a grounding in analytical methods. Prerequisite: Chemistry 1 and 3. *Both terms, three hours.*

Associate Professor WHEELER.

5. Organic Chemistry. Prerequisite, Chemistry 1 and 3. *Both terms: lectures, two hours; laboratory, one to three hours.*

Professor HERTY.

6. The Theories of Chemistry. Prerequisite, Chemistry 1, 3, 4, 5. *Both terms, two hours.*

Associate Professor MILLS.

7. Physical Chemistry; lectures and text-books, with laboratory work; prerequisite, Chemistry 1 to 5 inclusive. *Both terms, two hours.*

7A. Electro-Chemistry: theory and application of electricity to chemical processes; prerequisite, Chemistry 1 to 5 inclusive. *Both terms, two hours.*

Professor HERTY.

8. Quantitative Analysis; laboratory work; gas analysis and extension of course 4 in technical lines; bacteriological examination of water (with Professor Manning); research; prerequisite, Chemistry 1, 3, and 4. *Both terms, five hours.*

11. Research in Inorganic and Analytical Chemistry. This course (with 12 and 13) is intended only for applicants for the degree of Doctor of Philosophy or properly equipped students who desire special training in advanced chemical research. It requires, in addition to the laboratory, daily conferences with the professor and continual reference to the literature touching the matter under investigation. The work is usually assigned by the professor, but by special permit the student may elect to work upon problems to which he wishes to give particular attention. *Both terms, three hours or more.*

Associate Professor WHEELER.

12. Research in Organic Chemistry. Many lines of investigation are open in the cellulose field and other departments of Organic Chemistry. Investigations which have a bearing upon physiology may be undertaken, or the student may be guided in work of his own selection. *Both terms, three hours or more.*

Associate Professor MILLS.

13. Research in Physical Chemistry. Acquaintance with the Calculus is required for this course. *Both terms, three hours or more.*

Professor HERTY.

14. Advanced Inorganic Chemistry. The elements are studied with the idea of showing the fundamental laws of Chemistry and the deep-seated relations involved in and leading up to the Periodic System. Attention is also given to those portions of Inorganic Chemistry not usually dwelt upon in the regular courses. The applications of physico-chemical laws and generalizations are emphasized throughout the course *Both terms, two hours.*

Associate Professor WHEELER.

25. Lectures and Seminary work in special chapters of Organic Chemistry. *Both terms, two hours.*

The *Journal Club* meets bi-weekly. The current journals, American, English, German, and French, purely scientific and technical, are reviewed by the students and instructors. Attendance is expected of students in all courses except 1 and 3.

PHYSICS.

JOSHUA WALKER GORE, C.E., *Professor of Physics.*

JAMES EDWARD LATTA, A.M., *Associate Professor of Physics.*

JULIAN COLGATE HINES, JR., B.S., *Assistant in Physics.*

Professor GORE.

A. Elementary Physics: lectures, with text-book; weekly written reviews. Can be counted only for entrance to Groups 2 and 3; open also to students in Departments of Medicine and Pharmacy. *Both terms, three hours.*

1. General Physics; lectures with text-book; problems; laboratory work; prerequisite, Mathematics 1. *Both terms, three hours.*

2. Advanced General Physics; lectures, recitations, and problem work; prerequisite, Physics 1 and Mathematics 2. *Both terms, two hours.*

4. General Study of Electricity and Magnetism, with laboratory work; prerequisite, Physics 1. *Both terms, two hours.*

4A. Electromagnetic Apparatus; direct current dynamos and motors; elementary study of alternating current machinery; testing and study of typical forms in the laboratory; prerequisite, Physics 1 and 4. *Both terms, two hours.*

5. Descriptive Astronomy: a general course; lectures and recitations; prerequisite, Physics 1. *Both terms, two hours.*

Associate Professor LATTA.

6. Thermodynamics. This course is intended for students who have taken Mathematics 2 or its equivalent, and are familiar with the elementary facts and principles of Heat. The texts used are Edser's "Heat for Advanced Students", and Ewing's "The Steam Engine and Other Heat Engines". These are supplemented with lectures and problem work. The course undertakes to give familiarity with the two fundamental laws of thermodynamics, and with their application to problems involving heat and mechanical energy. Such subjects as the following are studied: The specific heats of gases at constant pressure and at constant volume; Kelvin's absolute scale of temperature; the physical properties of gases and saturated vapors; the theory of heat engines; the theory of refrigerating machines; the transmission of power by compressed air. *Both terms, three hours.*

7. Alternating Currents and Alternating Current Machinery. This course is open to students who have taken Mathematics 2, and Physics 1,4, and 4A. Those who take the course are expected to read Franklin and Williamson's *Alternating Currents.* The class-room work, however, consists merely of lectures on the theory and use of alternating currents of electricity. From five to eight hours of each week are spent in the laboratory, which is equipped with two alternating current dynamos belted to two direct current motors, a rotary converter, a single phase induction motor, a three phase induction motor, a 10,000-volt testing set, a synchroscope, a set of transformers including both the shell and the core types, a friction brake, and a liberal supply of condensers, voltmeters, ammeters, wattmeters and other apparatus. The student is given practice in dealing with circuits containing inductance and capacity, in making various transformer connections, and in run-

ning tests on generators, motors and transformers. *Both terms, four hours.*

8. Primary and Secondary Batteries. Course 8 is arranged for students who desire an elementary but thoroughly modern and practical treatment of the galvanic cell and the storage battery. The theory of the primary cell is first studied, laws for the calculation of electromotive force developed and the characteristics of modern types considered. The study of the storage battery follows; and some of the subjects considered are: The fundamental equation of the storage cell; the relative advantages of the Planté and Faure types; the best rates of charge and discharge; care and management of secondary batteries; engineering uses of the storage battery, etc. *Both terms, two hours.*

9. Electric Wiring and Distribution: a study of circuits for light and power; prerequisite, fall term of Physics 7. *Spring term, two hours.*

10. Electric testing: experimental study of electromagnetic machinery and other apparatus; prerequisite, Physics 7. *Both terms, three hours.*

MATHEMATICS.

William Cain, C.E., *Professor of Mathematics.*
Archibald Henderson, Ph.D., *Associate Professor of Mathematics.*
Marvin Hendrix Stacy, A.M., *Associate Professor of Civil Engineering.*
Thomas Felix Hickerson, Ph.B., *Instructor in Mathematics.*
Nathaniel Cortlandt Curtis, Ph.B., S.B., *Instructor in Drawing.*
Robert Henry McLain, *Assistant in Mathematics.*

Associate Professor Henderson and Messrs. Hickerson and McLain.

1. Algebra, from Quadratics to Determinants (Fischer and Schwatt's *Quadratics and Beyond*); Geometry from Book IV. through Solid Geometry (Wells' *Essentials*); Plane Trigonometry and Logarithms (Ashton and Marsh's *Trigonometry*). *Both terms, four hours.*

Professor CAIN.

2. Brief Course in Conic Sections (Ashton's *Analytic Geometry*); Elementary Course in Differential and Integral Calculus (Cain's *Brief Course in the Calculus*). *Both terms, three hours.*

Associate Professor HENDERSON.

3A. (*a*) Higher Algebra; (*b*) Elementary Mechanics (Loney); prerequisite, Mathematics 1. *Both terms, three hours.*

Professor CAIN.

4. Calculus, Analytic Mechanics; prerequisite, Mathematics 2. *Both terms, three hours.*

5. Theory of Equations (Burnside and Panton); prerequisite, Mathematics 2. *Both terms, three hours.*

To be omitted in 1906–1907.

Associate Professor HENDERSON.

6. Differential Equations (Murray); prerequisite, Mathematics 4. *Both terms, three hours.*

15. Differential and Integral Calculus; lectures. *Both terms, two hours.*

Civil Engineering.

Associate Professor STACY.

3. Mathematics. (*a*) Surveying (Raymond); lectures, with text-book; adjustment of instrument; field practice. (*b*) Railroad Surveying; lectures, with text-book; field practice; prerequisite, Mathematics 1. *Both terms, two hours.*

Mr. CURTIS.

3B. Graphics: Descriptive Geometry, Shades, Shadows, and Perspective. *Both terms, two hours.*

Associate Professor STACY.

7. Mathematics. Railroad Surveying and Railroad Engineering; lectures, with text-books; field work; prerequisite, Mathematics 2 and 3. *Both terms, two hours.*

Associate Professor HENDERSON.

7A. Mathematics. Hydraulics, and Sanitary Engineering; prerequisite, Mathematics 3 and 4. *Both terms, two hours.*

Professor CAIN.

8. Mechanics of Materials; prerequisite, Mathematics 4. *Both terms, three hours.*

10. Stresses in Bridges and Roof Trusses, Graphical Statics; prerequisite, Mathematics 4. *Both terms, three hours.*

The equipment for field practice in Civil Engineering includes chains and tapes, levelling rods, compasses, transits, levels, a sextant, a plane table, and all necessary accessories.

Drawing and Architecture.

Mr. CURTIS.

1. Freehand Drawing. *Both terms, two hours.*
2. Mechanical and Topographical Drawing. *Both terms, two hours.*
3. Mechanical Drawing. *Both terms, two hours.*
4. Elements of Architecture. *Both terms, two hours.*
5. Advanced Freehand Drawing. *Both terms, two hours.*
6. Theory of Perspective. *Spring term, two hours.*

GEOLOGY AND MINERALOGY.

COLLIER COBB, A.M., *Professor of Geology and Mineralogy.*
JOSEPH HYDE PRATT, PH.D., *Professor of Economic Geology.*
EDWIN BEDFORD JEFFRESS, *Assistant in Geology.*
BENNETT HESTER PERRY, *Assistant in Geology.*

Professor COBB and Messrs. JEFFRESS and PERRY.

1. Elementary Geology; lectures with field work; laboratory work on the common minerals and rocks. *Both terms, three hours.*
2. Mineralogy; lectures with laboratory and field work; Crosby's *Tables* and Dana's *Text-book of Mineralogy*. *Both terms, two hours.*
3. General Critical Geology; lectures with field work; laboratory work on rocks and fossils; theses. *Both terms, three hours.*

4. Economic Geology: ore deposits, economic minerals, soils, water supply; lectures with laboratory and field work; prerequisite, Geology 1 or 3 and Chemistry 1 and 3. *Both terms, three hours.*

5. Petrography; lectures, laboratory work, and theses; prerequisite, Geology 1 or 3. *Both terms, two hours.*

6. Advanced field work and special research in Geology or Geography; problems and work adapted to the professional needs of the student; prerequisite, Geology 2 and 3. *Both terms, three hours.*

8. Origin and Nature of Soils; field work, laboratory work, and theses. *Both terms, three hours.*

Professor PRATT.

11. Mineral and Ore Deposits; lectures supplemented by laboratory and field work. *Twenty-four lectures (spring term).*

12. Principles and Practice in General Mining; lectures supplemented by visits to different mining regions.

Professor COBB.

13. Advanced Geological Field Work and Special Research; studies in the Deep River areas of the triassic and Wadesboro rocks; a brief examination of the Potomac, Eocene, Lafayette, and Columbia deposits. This course is given in the summer. It covers five weeks, of which one is spent in Chapel Hill with daily meetings; the remaining four weeks are devoted to field work. Students who take this course will be expected to devote all their time to it. *One term, three hours.*

The Geological Seminary meets fortnightly for review and discussion of current geological literature, and for the presentation of original papers.

7. Research course in historical geology. *Both terms, three hours.*

Course in Soil Investigation.

1. Agricultural Soils. An elementary course covering the nature, origin, and classification of soils, based on G. P. Merrill's *Rocks, Rock Weathering and Soils*, F. H. King's *The Soil*, and reports and bulletins of the Bureau of Soils, U. S. Department of Agriculture; lectures, reading, field and laboratory work. *Fall term, three hours.*

2. Soils of the United States: an introductory study of the chief soil provinces, soil series, and soil areas of the United States, with special reference to the soils of North Carolina. Open only to Graduates. *Spring term, two hours.*

3. Soil Mapping. Preparation of large scale soil maps of the Chapel Hill region.

4. Soil Seminary. Study of soil literature with preparation of reports on selected subjects. Open to students engaged in soil work. *One evening each week during February and March.*

FREE TUITION.

By an act of the Legislature in 1887, free tuition is given, in the College, to candidates for the ministry, to the sons of ministers, to young men under bodily infirmity, to teachers, and to young men preparing to teach. This enables the University to aid most effectively the public school teachers of the State.

LOAN FUNDS.

The Deems Fund. (Established in 1879). A fund of six hundred dollars was established by Rev. Dr. Charles Force Deems, late pastor of the Church of the Strangers, New York City, formerly a Professor in the University, in memory of his son, Lieutenant Theodore Dissosway Deems. In 1881 the fund was greatly enlarged, through the munificence of Mr. William H. Vanderbilt, by a gift of ten thousand dollars, "as an addition to the Deems fund, to be loaned to indigent students of the University."

Applications for loans will not be considered unless accompanied by testimonials from responsible persons as to poverty and merit. The funds are limited in amount and are loaned only on the security of two approved signatures and at the legal rate of interest.

All applications for loans must be filed in the President's office on or before August 15.

EXPENSES.

Every effort is made to reduce to the lowest point the necessary expenses of an education at the University. The charges for each of the two terms are as follows:

Tuition fee	$30.00
Fee for matriculation, etc	12.50
Total	$42.50

Students taking courses in the laboratories are charged a small fee for materials. Every student must keep on deposit with the Bursar two dollars as security for damages. Willful damage to University property is charged to the perpetrator, if known, otherwise it is assessed upon all students of the University. Any balance is returned to the student at the end of the year.

Good board is furnished at Commons for eight dollars a month. A few students earn their board at Commons by waiting on the tables. In the private clubs board may be reduced to a minimum of six dollars a month. The entire annual expenses need not exceed three hundred dollars, and they may be reduced to two hundred dollars.

It is confidently believed that no institution offers wider opportunities of self-help to meritorious students of slender means. The desire is that no worthy boy, however poor, shall ever be turned away for lack of means. To such the University and town offer unusual opportunities for support. Many students are now working their way through college by every form of honorable labor. A number are here as a result of money earned or borrowed. Seventy are aided by loans, and about five hundred have received aid from the University in loans and scholarships in the past twenty years. A few students are selected by the authorities as waiters at Commons. Otherwise all opportunities available in the University and town must be secured by the personal effort of the individual, or with the assistance of the Faculty Committee on Self-Help. They are not assigned by the President.

DORMITORY ACCOMMODATIONS.

The University buildings contain one hundred and seventy-four unfurnished double rooms, available for the accommodation of students. There is no charge for service in addition to the rent. All rooms are fitted with electric lights. Room rent ranges from 75 cents to $2.75 per month for each occupant, the price depending on the location of the room.

All the buildings of the University are heated by hot water according to the most improved methods. In the dormitories the charge for heating and light will be $2.00 per month for each room.

LABORATORIES AND MUSEUMS.

THE PHYSICAL LABORATORY.

Joshua Walker Gore, C.E., Director and *Professor of Physics.*
James Edward Latta, A.M., *Associate Professor of Physics.*
Julian Colgate Hines, Jr., B.S., *Assistant in Physics.*

The Physical Laboratory occupies the eastern half of the main floor and almost the whole of the basement floor of the Alumni Building, amounting to about seven thousand square feet of floor space.

The main floor is divided into a lecture room, an apparatus room, laboratory for students in the general course, Physics 1, and a laboratory for X-ray and photometric work.

In the rooms of the basement are located the dynamos, motors, electrical laboratory, electric furnaces, storage battery, and the workshops for wood and metal.

A special appropriation granted by the Legislature in 1903 has made it possible to equip the Physical Laboratory with standard types of electrical machines: dynamos, motors, transformers, meters, switchboard, storage battery, electric furnace, and the accessories, needed for practical instruction in electrical engineering. The facilities for the general teaching of Physics experimentally have likewise been increased.

The electric light and central heating plants constitute valuable adjuncts to the labaratory.

CHEMISTRY HALL.

Charles Holmes Herty, Ph.D., Director and *Smith Professor of General and Industrial Chemistry.*

ALVIN SAWYER WHEELER, PH.D., *Associate Professor of Organic Chemistry.*
JAMES EDWARD MILLS, PH.D., *Associate Professor of Physical Chemistry.*
ROYALL OSCAR EUGENE DAVIS, PH D., *Instructor in Chemistry.*
EDGAR EUGENE RANDOLPH, A.B. *Assistant in Chemistry.*
GEORGE ANDREW JOHNSTON, B.S., *Assistant in Chemistry.*
RISDEN TYLER ALLEN, *Assistant in Chemistry.*
HAMPDEN HILL, *Assistant in Chemistry.*

The overcrowded condition of the laboratories and lecture room in Person Hall and the unsatisfactory ventilation of the laboratories made urgent the need for a larger and better arranged building for the Department of Chemistry. These facts, together with complete plans for a new building, were laid before the last Legislature and an appropriation of $50,000 asked. The appropriation was voted, and in a short while the work of construction was under way.

The new building, "Chemistry Hall," is located east of Alumni Hall and north of the New East building, facing west. By the selection of this location good water pressure is assured for all of the laboratories in the building.

The outer walls are of salt and pepper pressed brick laid with black mortar.

The main building, 120 x 68 x 48, comprises a first floor, a second floor, and a commodious basement. Adjoining this main building and to the rear of the center is the lecture room, 41 x 62 x 22.

To the right on entering the main building are the office and the private laboratory of the Director, the Department library, and a small lecture room; to the left are the office and private laboratory of the Associate Professor and a large laboratory for organic chemistry.

On the rear or east side of the first floor are the laboratories for quantitative analysis, advanced quantitative analysis, and technical chemistry.

On the second floor are the laboratories for general chemistry, qualitative analysis, physical chemistry, electro-chemistry, a research laboratory, laboratory for physiological chemistry, a fume room, and a small lecture room. At the ends of the corridor on the second floor are a balance room, preparation room, and a dark room for spectroscopic work.

In the basement are the assay laboratory, rooms for electric furnace,

technical chemistry, constant temperature, photographic rooms, a carpenter shop, store room for heavy chemicals, and a large stock room for chemicals and apparatus. From this stock room material is supplied to each floor of the building by an elevator.

Each laboratory is furnished with ample fume closets for the removal of noxious gases, while pivoted window sash insure proper ventilation of the rooms.

The entire building is heated by hot water from the central system of the University.

The main entrance hall leads direct to the lecture room, which is well lighted by high arched windows and has a seating capacity of two hundred, which can be increased somewhat as need requires. To the rear of the lecture room are a preparation room and a museum for specimens of typical chemicals, minerals, and products illustrating the various phases of chemical industries. Above these two last rooms is a small room for filing charts, diagrams, etc., used in illustrating lectures.

THE GEOLOGICAL LABORATORY AND MUSEUM.

Collier Cobb, A.M., Director and *Professor of Geology and Mineralogy.*
Joseph Hyde Pratt, Ph.D., *Professor of Economic Geology.*
Edwin Bedford Jeffress, *Assistant in Geology.*
Bennett Hester Perry, *Assistant in Geology.*

The Geological Laboratory occupies the first floor of the New East Building. In addition to a lecture room with a seating capacity of about ninety, there is a large laboratory supplied with working collections of minerals, rocks and fossils, and with photographs, maps, and models illustrating geological structure. The laboratory is furnished with two petrographical microscopes, and with apparatus for the slicing and polishing of rocks. Microscopic slides have been made of most of the specimens from North Carolina; and the department has, also, sections of the typical European rocks. Sections of the rocks around Chapel Hill, and the igneous rocks of the Boston Basin, made by the late Hunter Lee Harris, of the class of 1889, were given to the geological department. A room for photographic work has recently been added.

The University possesses a collection of more than two thousand specimens of building stones, coal, and various products illustrating the economic geology of the State. These are arranged in an exhibition room of six hundred and fifty square feet of floor space. Here are kept also the sections taken with a diamond drill in the coal regions of Pennsylvania, in the region around King's Mountain, where the Summer School of Geology held its sessions, in the Dan River coal fields, and in the Triassic Rocks at Durham, N. C. A complete set of the ores of the precious metals found along the line of the Atchison, Topeka, and Santa Fé Railroad is included in the collection. Valuable additions have been made to the collections of fossils also, affording increased opportunity for laboratory work in historical geology and palaeontology. The collection illustrating economic geology has been largely increased.

The department library, which occupies a room adjoining the exhibition room, is supplied with State and United States Reports, the papers of working geologists, the best works upon Geology, and scientific periodicals.

THE ELISHA MITCHELL SCIENTIFIC SOCIETY.

HENRY VAN PETERS WILSON, PH.D., *President.*
ARCHIBALD HENDERSON, PH.D., *Vice-President.*
FRANCIS PRESTON VENABLE, PH.D., D.SC., LL.D., *Permanent Secretary and Treasurer.*
ALVIN SAWYER WHEELER, PH.D., *Recording Secretary.*

The Elisha Mitchell Scientific Society holds monthly meetings during the college year for the discussion of scientific subjects. A Journal, which is the official organ of the North Carolina Academy of Science, is issued quarterly. The object of the Society is to encourage scientific research and to record such matters as pertain to the natural history of the State. The membership is at present restricted to the Faculty and students of the University and members of the staff of the Geological Survey

At the monthly meetings, which are ordinarily held on the second Tuesday of each month, excellent opportunities are afforded the students to

get beyond the ordinary routine of the class room by hearing, reading, and discussing papers on scientific subjects.

The Journal is in a measure a bulletin of the scientific laborotories of the University, and contains many articles written by research students. It is now in the twenty-first year. The volumes already issued contain twenty-two hundred pages. By the exchange of the Journal with more than three hundred scientific journals and periodicals, over ten thousand books and pamphlets have been collected, all of which are arranged in the University Library.